WE CLAIM:

1. A photonic switch for a DWDM network comprising:

a plurality *I* of input ports and a plurality *I'* of output ports;

an optical demultiplexer for separating said wavelength λ_k from an input multichannel signal Sin(k,i) received on an input port *i*, and directing same on an assigned ingress area along a predetermined input path;

a switching block for directing a wavelength λ_k along an optical path from an assigned ingress area to an associated egress area selected from a plurality of egress areas; and

an optical multiplexer for directing said wavelength λ_k from said associated egress area along a predetermined output path, and combining same into an output multichannel signal Sout (k',i'), transmitted on a port *i'*.

2. A photonic switch as claimed in claim 1, wherein said switching block comprises:

a switch fabric for cross-connecting said wavelength λ_k from said input multichannel signal Sin(k,i) to said output multichannel signal Sout(k',i'); and

a control unit for selecting said associated egress area and configuring adjust said switch fabric to direct said wavelength along an adaptable path between said assigned ingress area and said associated egress area.

3. A photonic switch as claimed in claim 2, wherein said switch fabric comprises an input matrix with *K* rows and *I* columns of input optical switching elements, and an output matrix with *K'* rows and *I'* columns of output optical switching elements;

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wherein each input port is associated with a column of said input matrix and each wavelength arriving on said input port is associated with a row of said input matrix, and

wherein each said output port is associated with a column of said output matrix and each wavelength transmitted at said output port is associated with a row of said output matrix.

4. A photonic switch as claimed in claim 3, wherein said switching elements have minimum four degrees of freedom of orientation.

5. A photonic switch as claimed in claim 3, wherein said switching elements are 3-D MEMS mirrors.

6. A photonic switch as claimed in claim 3, wherein said optical demultiplexer and said input ports are arranged in a predetermined position relative to each other along said predetermined input path, for separating each input multichannel signal into component wavelengths according an area of incidence of said input multichannel signal on said demultiplexer.

7. A photonic switch as claimed in claim 6, wherein said demultiplexer and said input matrix are arranged in a predetermined position relative to each other along said predetermined input path, for directing each said component wavelength from said demultiplexer to said input matrix according to said wavelength λ_K and said input port *i*.

8. A photonic switch as claimed in claim 1, further comprising optical elements arranged along said first predetermined input path for directing said wavelength from said input port *i* on said assigned ingress area.

9. A photonic switch as claimed in claim 3, wherein said multiplexer and said output ports are arranged in a predetermined position relative to each other along said predetermined output path, for combining all wavelengths arriving in a certain area of incidence on said multiplexer within an output multichannel signal.

10. A photonic switch as claimed in claim 9, wherein said demultiplexer and said output matrix are arranged in a predetermined position relative to each other along said predetermined output path, for directing each said wavelength λ_k from said output matrix to said certain area of incidence according to said wavelength • $_k$ and said input port *i*.

11. A photonic switch as claimed in claim 10, further comprising optical elements arranged along said second predetermined path for directing said wavelength from said egress area on said associated output port.

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12. A photonic switch as claimed in claim 2, wherein *I=I'* and *i=i'*.

13. A photonic switch as claimed n claim 2, wherein *K=K'*, *k=k'*, *I=I'* and *i=i'*.

14. A photonic switch as claimed in claim 1, wherein said switching block comprises:

a switch fabric for cross-connecting said wavelength λ_k from said input multichannel signal Sin(k,i) to said output multichannel signal Sout(k',i') and for cross-connecting an add wavelength incident on said add zone to said output multichannel signal; and

a control unit for configuring said switch fabric to direct said wavelength along an adaptable path between said assigned ingress area and said associated egress area, and configuring said switch fabric to

direct said add wavelength along an adaptable add path between said add zone and said associated egress area.

15. A photonic switch as claimed in claim 14, further comprising a plurality of add ports.

16. A photonic switch as claimed in claim 15, wherein said switch fabric comprises an input matrix with an input switching zone of *K* rows and *I* columns of input optical switching elements and an add zone of *M* rows and *N* columns of input optical switching elements,

wherein each input port is associated with a column of said switching zone and each wavelength is associated with a row of said switching zone, and

wherein each add port is associated with a column of said add zone and each wavelength arriving on said add port is associated with a row of said add zone.

17. A photonic switch as claimed in claim 1 wherein said switching block comprises:

a switch fabric for cross-connecting said wavelength λ_k from said input multichannel signal Sin(k,i) to said output multichannel signal Sout(k',i') and for cross-connecting drop wavelength from said input multichannel signal on said drop zone; and

a control unit for configuring said switch fabric to direct said wavelength along an adaptable path between said assigned ingress area and said associated egress area and for directing said drop wavelength along an adaptable drop path between said assigned ingress area and said drop zone.

18. A photonic switch as claimed in claim 1, further comprising a plurality of drop ports.

19. A photonic switch as claimed in claim 18, wherein said switch fabric comprises an output matrix with *K'* rows and *l'* columns of output optical switching elements and a drop zone of *M'* rows and *N'* columns of output optical switching elements,

wherein each said output port is associated with a column of said switching zone and each said wavelength is associated with a row of said switching zone, and

wherein each drop port is associated with a column of said drop zone and each wavelength arriving on said drop port is associated with a row of said drop zone.

20. A method of routing a wavelength within a photonic switch of a DWDM network, comprising:

pre-establishing an input optical path between an input port associated with said wavelength and an assigned optical switching element of an input matrix, according to a connectivity map;

establishing an adaptable path from said assigned optical switching element to an associated optical switching element of an output matrix; and

pre-establishing an output optical path between said associated optical switching element and an output port of interest according to said connectivity map.

21. A method as claimed in claim 20, further comprising transiting said adaptable route to connect said assigned optical switching element to another optical switching element of said output matrix, whenever said connectivity map changes.

22. A photonic switch for routing a plurality of wavelengths of a DWD transport network, between a plurality of input ports and a plurality of output ports comprising:

an all-optical switch fabric for cross-connecting a wavelength λ_k from an optical input multichannel signal Sin(k,i) to an optical output multichannel signal Sout(k',i'), along an adaptable optical path; and

a control unit for configuring said adaptable optical path.

23. A photonic switch as claimed in claim 22 further comprising an optical demultiplexer for separating said wavelength λ_k from said optical input multichannel signal and directing same on an assigned ingress area of said switch fabric along a predetermined input path.

24. A photonic switch as claimed in claim 23, further comprising an optical multiplexer for receiving said wavelength λ_k received along a predetermined output path from an associated egress area of said switch fabric, and combining same with said multichannel output signal.

25. A photonic switch as claimed in claim 22, wherein said all-optical switch fabric comprises an input matrix of *K* rows and *I* columns of optical switching elements, wherein each input port is associated with a column of said input matrix, and each wavelength is associated with a row of said input matrix.

26. A photonic switch as claimed in claim 25, wherein said all-optical switch fabric further comprises an output matrix of *K* rows and *I* columns of optical switching elements, wherein each output port is associated with a column of said output matrix and each wavelength is associated with a row of said output matrix.

27. A photonic switch as claimed in claim 22, wherein said all-optical switch fabric comprises an input matrix with a switching zone of *K* rows and *I* columns of optical switching elements, and an add zone of *M* rows and *N* columns of input optical switching elements,

wherein each input port is associated with a column of said input matrix, and each wavelength is associated with a row of said input matrix, and

wherein each add port is associated with a column of said add zone and each wavelength arriving on said add port is associated with a row of said add zone.

28. A photonic switch as claimed in claim 22, wherein said switch fabric comprises an output matrix with *K'* rows and *l'* columns of output optical switching elements, wherein each said output port is associated with a column of said output matrix, and each said wavelength is associated with a row of said output matrix.

29. A photonic switch as claimed in claim 22, wherein said switch fabric comprises an output matrix with a switching zone of *K'* rows and *l'* columns of optical switching elements, and a drop zone of *M'* rows and *N'* columns of optical switching elements,

wherein each said output port is associated with a column of said switching zone and each said wavelength is associated with a row of said output matrix, and

wherein each drop port is associated with a column of said drop zone and each wavelength arriving on said drop port is associated with a row of said drop zone.

30. A photonic switch as claimed in claim 3, wherein said input and said output matrices are arranged in two different planes.

31. A photonic switch as claimed in claim 30, wherein said planes are substantially parallel to each-other.

32. A photonic switch as claimed in claim 3 wherein said input and output matrices are arranged substantially in the same plane and wherein said switch block further comprises directing means arranged in the path of the light between said input and output matrices.